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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,659	06/23/2003	Tetsuzo Ueda	60188-613	6152

7590 08/04/2005

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EXAMINER	
MAI, ANH D	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/600,659	UEDA ET AL.
	Examiner	Art Unit
	Anh D. Mai	2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-27,29,30 and 34-47* is/are pending in the application.

4a) Of the above claim(s) *22-25,30,40,41 and 44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-21,26,27,29,34-39,42,43 and 45-47* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 22, 2005 has been entered.

Status of the Claims

2. Amendment filed July 22, 2005 has been entered. Claims 15, 17, 26, 27, 34-36, 38, 39, 42 and 43 have been amended. Claims 45-47 have been added. Claims 15-27, 29, 30 and 34-47 are pending. Claims 22-25, 30, 40, 41 and 44 have been withdrawn.

Election/Restrictions

3. Applicant traverses the restriction of claim 44 on the ground(s) that "the claim merely recites an additional feature to the elected embodiment, and is not by itself a distinct embodiment". This is not found persuasive because the same restriction has been made on claims 24, 25 and 30. That restriction has been agreed upon by the Applicants. The elected invention as shown if Fig. 2A-3D, however, does not have a current confinement film.

The requirement is still deemed proper and is therefore made FINAL.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

METHOD FOR FABRICATING LIGHT-EMITTING DEVICE UTILIZING SUBSTRATE TRANSFER BY LASER DECOMPOSITION.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 15-21, 34-39, 42, 43 and 45 (elected claims) are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to claim 15, there does not appear to be a written description of the claim limitation "wherein the first electrode has a **reflectance of 55% or more** with respect to light emitted from the semiconductor multilayer film" in the application as filed.

In a telephone inquiry initiated by this Examiner on August 1, 2005, Applicants were asked to direct this Examiner to the support for said limitation, since Applicants did not identify

the support for said limitation in the Remarks. The answer to the inquiry was: the "first electrode has a reflectance of 55% or more" is inherent of the material.

However, upon a review, there is no specific material claimed and the specification fails to provide support for any material that has a reflectance of **55%** or more. There is no specific reflectivity of any materials disclosed.

What material has a reflectance of 55% or more ?

Applicant must provide support for his assertion or the limitation be removed form the claims.

6. Claims 27 and 46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to claim 27, There does not appear to be a written description of the claim limitation "between steps f0 and step g), further including the steps of: h) bonding a second supporting material onto the surface of the semiconductor multilayer film and the second electrode opposite to the *first supporting material*; i) **etching the thick metal film** selectively at the periphery of the device area to **form an opening**; and j) cutting the device to pieces or selectively etching the semiconductor multilayer film **through the opening of the thick metal film**; and k) **peeling off the second supporting material from the device**" in the application as filed.

As shown in the specification, the first supporting material is layer 41, the second supporting material that opposite the first supporting material should be layer 18, the thick metal film that formed over the first electrode is layer 16.

Finding:

A) the thick metal film 16 has never been etched to form opening.

B) the cut has never been performed through thick metal film 16.

C) the second support material 18 has never been peeled off or removed.

Specification fails to support the amended claim, thus new matters have been inserted. Therefore, claim 27 can not be examined for it merits.

With respect to claim 46, there does not appear to be a written description of the claim limitation "the total thickness of the thick metal film and the first supporting material is 150 μm or more" in the application as filed.

According to the specification, the thick metal film 16 has a thickness of about 500 nm and that of the first supporting material 41 is about 100 μm. (See page 19).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims **15**-18, 20, 21, 34, 35, 38, 39, 42, 43, 45; and **26**, 29, 46, 47 are rejected under 35 U.S.C. 102(a) as being anticipated by Yoo (U.S. Pub. No. 2003/0189212).

With respect to claim **15**, as best understood by the examiner, Yoo teaches method for fabricating a semiconductor light-emitting device as claimed including the steps of:

a) forming, on a substrate (120) of a single crystal, a semiconductor multilayer film (120) including at least two semiconductor layers having mutually different conductivity types;

b) forming a first electrode (230) on a surface of the semiconductor multilayer film (120), wherein the first electrode (230) has a reflectance of 55% or more with respect to light emitted from the semiconductor multilayer film (120);

c) forming a thick metal film (240) over the first electrode (230), wherein at least part of the first electrode (230) includes a different material than that of the thick metal film (240);

d) separating the substrate (120) from the semiconductor multilayer film (120); and

e) forming a second electrode (190) on a surface of the semiconductor multilayer film (120) opposite to the surface of semiconductor multilayer film on which the first electrode (230) is formed. (See Figs. 2A-15).

With respect to claim 16, the semiconductor multilayer film (120) of Yoo is made of a Group III-V compound semiconductor containing nitrogen as a Group V element.

With respect to claim 17, in the step d) of Yoo, irradiating light having (214) having a wave length at which the light passes through the substrate (122) and is absorbed in part of the

semiconductor multilayer film (120) is applied onto the surface of the substrate (122) opposite to the semiconductor multilayer film (120), so that a decomposition layer is formed inside the semiconductor multilayer film (120) by decomposition of part of the semiconductor multilayer film (120), thereby separating the substrate (122) from the semiconductor multilayer film (120).

With respect to claim 18, the irradiating light is pulsing laser light beam.

With respect to claim 20, the irradiating light of Yoo also includes the substrate is scanned within the surface thereof.

With respect to claim 21, the irradiating light of Yoo also includes applying while heating the substrate.

With respect to claim 34, the thick metal film (240) of Yoo is made of gold or copper.

With respect to claim 35, the thick metal film (240) of Yoo is made by plating.

With respect to claim 38, one of the first (190) and second (240) electrodes of Yoo has a reflectance of 90 % or higher with respect to light emitted from the semiconductor multilayer film.

With respect to claim 39, one of the first (190) and second (240) electrodes of Yoo is formed out of a single layer made of at least one material selected from the group consisting of gold, platinum, copper, silver or a multilayer film including at least two of these materials.

With respect to claim 42, one of the first (190) and second (240) electrode of Yoo provided on the surface of the semiconductor multilayer film (120) opposite to the thick metal film (340) is transparent (ITO).

With respect to claim 43, one of the first (190) and second (240) electrodes of Yoo provided on the surface of the semiconductor multilayer film (120) opposite to the thick metal film (240) is made of indium tin oxide or a metal containing nickel and having a thickness of 10 nm, thus, anticipates the claimed thickness.

With respect to claim 45, the thick metal film (240) of Yoo has a thickness of 50 μm or more, thus, anticipates claimed range.

With respect to claim **26**, Yoo teaches a method for fabricating a semiconductor light-emitting device (LED) as claimed including:

a) forming on a substrate (122) of a single crystals a semiconductor multilayer film (120) including at least two semiconductor layers having mutually different conductivity types;

b) forming a first electrode (190) on a surface of the semiconductor multilayer film (120);

c) forming a thick metal film over the first electrode (190);

d) bonding a first supporting material (198), which is made of plastic or metal material onto the thick metal film (192) for supporting the semiconductor multilayer film (120);

f) forming a second electrode (230) on a surface of the semiconductor multilayer film (120) opposite to the surface of the semiconductor multilayer film (120) on which the first electrode (190) is formed; and

g) peeling off the first supporting material (198) from the thick metal film (192) on the semiconductor multilayer film (120). (See Figs. 2A-15).

With respect to claim 27, since claim 27 comprises new matters, a reasonable examining of the merits of the claim is impossible.

With respect to claim 29, the plastic material (198) of Yoo is a polymer, epoxy, film, and the polymer film is provided, at a bonding surface thereof, with an adhesive layer that can be peeled off when heated.

With respect to claim 46, as best understood by the examiner, the total thick metal film (238) and the first supporting material (300) of Yoo is about 100 μm or more. (See Fig. 16).

With respect to claim 47, as best understood by the examiner, the final area of the thick metal film (192) in the complete device is smaller than that of the semiconductor multilayer film (120) of the complete device.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claim 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoo '212 as applied to claim 17 above, and further in view of Cheung et al. (6,071,795).

Yoo teaches a similar lift off process are described in U.S. Patent No. 6,071,795 to Cheung et al.

Thus, Yoo is shown to teach all the features of the claim with the exception of explicitly disclosing that irradiating light being mercury lamp.

However, Cheung teaches that it is not necessary to use a laser as the light source as long as the light intensity is sufficient to form the separation layer. UV light of sufficient intensity may be used in place of pulse laser light. (See col. 6, lines 7-1 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to separate the substrate of Yoo by irradiating a light source other than laser having sufficient intensity as taught by Cheung to form the separation layer.

Although not specifically disclosing mercury lamp, however, mercury lamp is well known in the art to emit UV radiation at 365 nm. Thus within the scope of UV as taught by Cheung.

9. Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoo '212 as applied to claim 15 above, and further in view of Wong et al. (U.S. Patent No. 6,627,921).

With respect to claim 36, Yoo teaches the first (190) and/or second (240) electrodes includes a metal layer located at the side thereof opposite to the semiconductor multilayer film (120).

Thus, Yoo is shown to teach all the features of the claim with the exception of using a metal having melting point of 300 °C or less. Note that the claimed melting point of 300 °C or less does not appear to be critical.

However, Wong teaches a method of fabricating LED including first (1020) and/or second (117) electrodes includes a metal layer (1141) located at the side thereof opposite to the semiconductor multilayer film (1110) and having a melting point of 300 °C or less.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to form an electrode of Yoo using a metal having low melting point as taught by Wong because low melting point metal means heat stress on the LED is avoided.

With respect to claim 37, the metal layer (1141) of Wong contains tin.

Response to Arguments

10. Applicant's arguments with respect to pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh D. Mai whose telephone number is (571) 272-1710. The examiner can normally be reached on 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANH D. MAI
PRIMARY EXAMINER